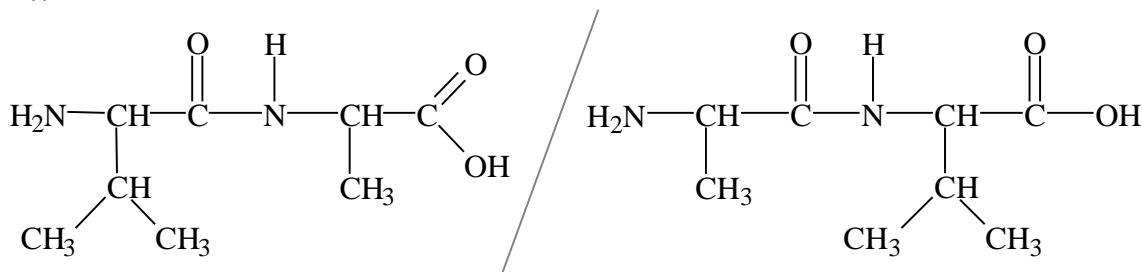


TBD07 – IB SL Question Review #4 MS

1. (a) vitamin C/ascorbic acid;
four/many OH groups/small proportion of hydrocarbon/can form hydrogen bonds with water/OWTTE; 2
- (b) vitamins A/retinol and C/ascorbic acid; 1
- (c) needed for uptake of calcium/phosphate; bone problem such as softening/weakness/malformation/rickets; 2
- [5]**
2. (a) *vitamin A*
retinol is fat-soluble;
vitamin C
ascorbic acid is water-soluble;
vitamin D
calciferol is fat-soluble;
fat-soluble because mainly composed of hydrocarbon chain/non polar groups;
water-soluble because of presence of several/many hydroxyl/OH/polar groups; 5
- Last [2] can be scored even if classification wrong or not attempted.*
- (b) Ca^{2+} /calcium; 2
- Do not accept Ca.*
- (c) vitamin D/calciferol; 2
- (c) vitamin A/retinol; 2
- (d) helps to form collagen/connective tissue/acts as antioxidant; 2
- (e) dissolves in water; 2
- oxidized/destroyed by heating/boiling; 2
- [13]**
3. (a) recovery from injury/surgery/starvation/illness/disease;
increased rate of protein synthesis/tissue/muscle building/increase in muscle mass; 2
- (b) enhances performance/strength unfairly; 1
- (c) mimics the action of progesterone in pregnancy;
prevents release of the egg/no ovulation;
prevents release of FSH and LH by the pituitary gland; 2
- Award [1] each for any two.*
- [5]**
4. *Benefits*
- improve food productivity/provide more food;
(food) crops are more resistant to disease/more resistant to insect attack
/more tolerant to toxins;
improve aesthetics/composition of some foods;
improved flavour;
improved texture;
improved nutritional value;
improved shelf life;
incorporation of anti-cancer substances/vaccines/reduce exposure to less healthy fats; 2 max
- Award [1] each for any two.*
- [2]**
5. 761.7 g of I_2 /274÷253.8 = 1.08 mol;
3 mol of I_2 /6 mol of I atoms/100÷278 = 0.360 mol;
(1.08÷0.360 =) 3 double bonds;
- Some correct working must be shown.*
- Allow ECF if M_r of iodine used as 126.9 instead of 253.8.*
- Accept correct alternative methods.*

6. (a) *low pH*
C;
high pH
A; 2
- (b) (i) place sample on gel;
with (buffer) solution of known pH;
apply voltage/potential difference;
Do not accept current applied.
develop/spray with ninhydrin;
measure distance moved/compare with known iso-electric point/
compare with standards; 3
Award [1] each for any three.
- (ii) *positive electrode*
glutamic acid;
negative electrode
arginine; 2

7. (a) (i) 2



Award [1] for the correct peptide bond and an additional [1] if the rest of the structure is correct.

Accept $\begin{array}{c} \text{O} \quad \text{H} \\ \parallel \quad | \\ -\text{C}-\text{N}- \end{array}$ *or* $\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{NH}- \end{array}$ *for the peptide bond.*

- (ii) condensation;
H₂O/water; 2
- (b) mixture placed on gel/paper;
use of buffer solution;
potential difference applied;
amino acids move differently (depending on pH/isoelectric point);
develop/spray with ninhydrin;
compare distances travelled with standards (OWTTE)/compare the
isoelectric points; 4
Award [1] each for any four.
- (c) (i) sequence/chain of amino acids; 1
(ii) ☐ helix = intramolecular/spiral/OWTTE;
☐ sheet = attraction between chains (accept intermolecular)/OWTTE; 2
Accept suitable diagrams.
8. (a) *vitamin A*
night blindness/xerophthalmia;
vitamin C
scurvy/scorbutus;
vitamin D
rickets; 2
Award [2] for 3 correct, [1] for 2 correct.
- (b) *vitamin A*
is stored (in the body) because it is fat-soluble;

[11]

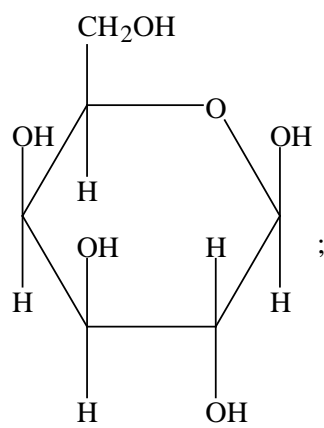
vitamin C

is excreted because it is water-soluble;

2

[4]

9.

 β isomer;

[2]